Indian Explosives Act (IV of 1884.)

SECOND ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES,

INDIA,

BEING HIS

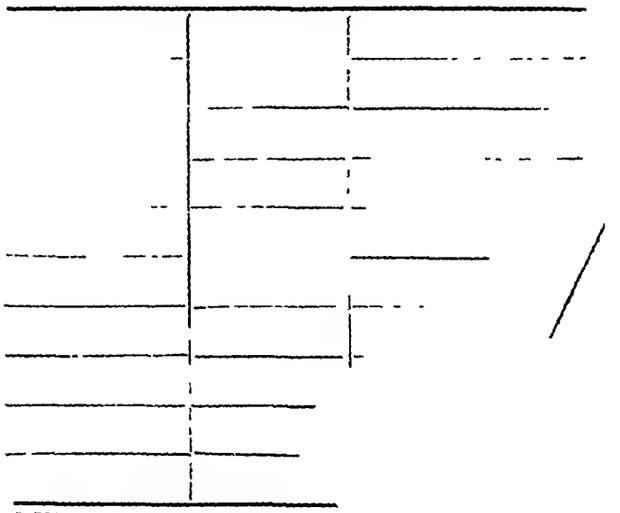
ANNUAL REPORT

FOR THE

Year ending 31st March 1901.

SIMLA:
AT THE GOVERNMENT CENTRAL PRINTING OFFICE.

1901.



Second Annual Report of the Chief Inspector of Explosives, India.

No. 269.

FROM

MAJOR C. A. MUSPRATT-WILLIAMS, R. A.,
Chief Inspector of Explosives,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
HOME DEPARTMENT.

Simla, the 26th April 1901.

SIR,

IN my capacity as Chief Inspector of Explosives, I have the honour to submit herewith a report of the work of my Department for the year ending 31st March 1901.

Number of explosives magazines.

2. During the year 1900, 94 licenses were granted in British India under Rule 17 of the rules to regulate the manufacture, possession and sale of explosives. Owing to the fact that in some cases two or more licensees store their explosives in the same magazine, the number of magazines is less than the number of licenses issued, and amounts to 84, as compared with 73 in 1898 and 77 in 1899. This number is likely to go on increasing, judging from the number of applications I have already received for plans for new magazines for the current year. In addition to these magazines, there were 7 big godowns licensed in Bombay under Rule 17 for the year 1900 for the storage of large quantities of fireworks. As it was pointed out to the Government of Bombay that these fireworks should be stored in properly constructed magazines complying with the conditions of the table of distances to be kept clear round magazines, and that these godowns, situated in the middle of Bombay City, might be the cause of a general conflagration, the license holders were informed that their licenses would not be renewed after the 31st December 1900, unless they provided themselves with proper magazines. A statement, showing the number and location of the magazines and also the number of licenses granted in each Presidency or Province, is given in Appendix A. From this statement it will be seen how widely these magazines are dispersed over the greater portion of British India, and consequently how much time has to be taken up in getting from place to place, which necessarily, to a certain extent, curtails the number of inspections that can be made during the year.

Cause of the reduction of licenses.

3. The number of licenses granted in 1900 is slightly less than in 1899, though the number of magazines has increased. The reason for this apparent anomaly is that in Bombay the licenses for 14 firework godowns, which cannot be classed as magazines, were not renewed for 1900. The above reduction in licenses consequently did not cause a corresponding reduction in the number of magazines, which has increased owing to the licensing of new magazines during 1900.

Amount of inspection work done during the year.

4. During the year 7 magazines were inspected three times, 26 twice, and 50 once. Those magazines are inspected most frequently, which are situated in the

neighbourhood of towns or in populous localities, or which contain large quantities of explosive or any explosive that it is considered especially necessary to examine and test. In addition to the magazines inspected, two visits were paid to the Roburite Factory at Karachi to see how the construction of the buildings was progressing. It is expected that the manufacture of Roburite will commence at this factory on or about the 1st of May 1901. From the above details it will be seen that altogether 125 inspections have been made during the year as compared with 107 last year, and 82 out of the 84 magazines licensed were visited. In addition a new Central Magazine at Meerut, which has just been completed but not licensed or taken into use, was also inspected. The two magazines that were not visited were licensed at the close of the year, and as they were situtated in remote and isolated places in districts which had already been visited, it was not thought advisable to make a special journey to them, as this would have interfered with other more necessary inspections, and also would have involved considerable expense to Government. As the appointments of Provincial Inspectors of Explosives were only abolished on the 1st January 1900, this is the first year in which the inspection work has been entirely carried out by this Department. I also inspected some of the Petroleum Installations at Calcutta, Rangoon, and Karachi.

Non-expert inspections.

5. During the year I have received 31 reports of non-expert inspections of magazines, 4 of these were from the Madras Presidency, 2 from the Bombay Presidency and 25 from the Bengal Presidency. Now that the inspection staff of this Department has been properly constituted and all magazines, whether major or minor, licensed under Rule 17, are visited at least once a year by this staff, I am of opinion that the submission of these non-expert reports might be done away with, as they are not now required by this Department and only give unnecessary extra work to district officers.

Condition of magazines.

6. I am glad to be able to state that, with very few exceptions, the Magazines are now in good order. I have found magazine holders generally most willing to carry out my recommendations, even when involving considerable expense, and my thanks are due to them for making my duties easy for me in this respect.

Condition of explosives in magazines.

7. The physical condition of all the explosives in magazines during the past year was found to be good with the exception of 30 lbs. of Blasting Gelatine in a magazine of the Assam-Bengal Railway at Golaghat. As this Blasting Gelatine was very soft and exuding nitro-glycerine, it was destroyed. None of the samples of explosives, taken at inspections, failed to pass the necessary tests, which were carried out by the Chemical Examiners of the several Presidencies and the Testing officer at Karachi.

Accidents.

8. No accidents have occurred in the magazines in the country, and as yet there is no factory in which the manufacture of explosives takes place. A list of other accidents by fire or explosion from explosives, inflammable substances, dangerous chemicals, etc., which have been brought to the notice of this Department between the 1st January 1900 and 31st December 1900 are given in Appendix B.

Gunpowder.

9. A good many of the accidents enumerated in Appendix B were preventable ones, inasmuch as they were caused by ignorance, carelessness or want of proper precautions. It will be seen that two very bad accidents, Nos. 4 and 6 on the list, have taken place in the manufacture of gunpowder on "registered premises", licensed under Rule 8, causing 13 and 7 deaths respectively. Both occurred during what is called the "incorporating or milling" process, which is carried out by the native method of pounding the mixture of charcoal, sulphur and saltpetre with a pestle and mortar, and of course the presence of any grit is practically certain to cause an explosion. This Department has no jurisdiction at present, with regard to these registered premises, either as regards inspection or licensing. As, I believe, there are "registered premises" in almost every

small town or even village in India, I am afraid it would be impracticable for this Department to undertake the inspection of the whole of them, but if a list of them could be supplied by Local Governments, certainly some of them could be inspected every year, especially those which happened to be on the road to or near the magazines, which are inspected. Rule 8 lays down that no more than 200 lbs. of gunpowder are to be on the premises at any one time, and on the license form, Form A, certain conditions and precautions are ordered to be carried out, but from the accounts of the accidents I am afraid it is somewhat doubtful whether these are rigidly enforced, and also whether any limitation is made to the number of persons engaged at one time in these operations, or any steps taken to prevent the presence of unauthorized persons who are not employed in the manufacture. As I have now got the magazines in good order, I propose to address the Local Governments with a view of effecting some improvement in the state of the registered premises, more especially, where manufacture is carried on.

Fireworks.

10. Fireworks have been responsible for 4 deaths, and injuries to 9 persons. It will be noticed that the greater proportion of these accidents have occurred from sulphur chlorate mixtures, the prohibition of which I have already recommended. This question is at present under the consideration of the Government of India.

Petroleum.

11. Oil fuel was the cause of one very bad accident, No. 25, on board a steamer, an explosion terminating in a conflagration, to which 14 persons succumbed. This accident was all the more lamentable inasmuch as it might never have occurred but for carelessness, ignorance or inexperience, and the non-supply of proper safety lamps. Also no rules or instructions for the guidance of those using the liquid fuel were supplied on board. As a result of this accident and another, No. 24, which resulted in the total destruction of a steamer, luckily without loss of life, draft rules under section 50 of the Inland Steam Vessels Act, to compel the observance of necessary precautions were drawn up by the Government of Burma, and were submitted to this Department for examination and for any additions that might be thought necessary. These rules, if strictly observed, will certainly minimize the chances of any such accidents occurring in the future.

Government accidents.

12. The following Government accidents have also been brought to the notice of this Department between the 1st January 1900 and 31st December 1900.

(*a*) At the Small Arms Ammunition Factory, Dum-Dum, on the 17th December 1900, a percussion cap ignited during the operation of extraction from an empty case. The flash was communicated to some composition which had lodged in the bend of the safety pipe, which led to a pail of water, and burnt the legs of a native, who was engaged in the operation. The man had orders to tap the pipe frequently to prevent accumulation of composition, and it is believed that neglect of these orders caused the accident.

(*b*) A bad accident causing the loss of 12 natives occurred on the Rangoon river on the 14th February 1900, on board a cargo boat, in which a quantity of unserviceable wetted gunpowder was taken down the river and thrown into it under the charge of a store sergeant and 24 natives (lascars and boatmen). In the evening, while the boat was at anchor after completion of this operation, a fire broke out, and the boat seems to have burnt so fast and fiercely that a number of the men were unable to escape from the flames, and others were so badly burnt that they died shortly afterwards. An enquiry was held, and it was thought most probable that the accident had been caused by a lighted match, thrown down by one of the crew, though there was no absolutely certain evidence to show this. As the timbers of the boat were probably impregnated with saltpetre from the wetted powder, and as also the garments of the crew were possibly in the same state, for they had not changed their garments since drowning the powder in the morning, the fierceness of the conflagration and the quickness with which it enveloped the men are not to be wondered at. This Department recommended

that men engaged in such operations should be clothed for the future in uninflammable clothing, and this suggestion is, I believe, being carried out.

(*c*) On the 13th December 1900, an accident occurred in the Rangoon arsenal, resulting in the death of one native and injuries to three. The men were engaged in breaking up a number of 7-pr. R. M. L. common shell, which had been a long time borne on the books of the arsenal as empty and unserviceable. The shells were fitted with fuze hole plugs, which do not appear to have been removed before the operations commenced. The shells were broken up by being struck with a heavy hammer, and the third shell, so treated, exploded. The shell was evidently a filled one, and probably fuzed with a fuze percussion R. L. No. 7 Mark II.

Robberies.

13. I regret to say that in the Hazaribagh district of the Bengal Presidency there have been several cases of magazines being broken into, and dynamite stolen. The police so far have been unable either to stop these robberies or to detect the perpetrators. It is most undesirable that dynamite should get into the hands of unprincipled persons, who may use it in dacoities to frighten away people from their habitations previous to robbing them, as has already happened, or may sell it to the many Cabuli merchants wandering over the country, through whose hands it might get across the frontier and be employed in the destruction of bridges and buildings. I have brought this very serious state of affairs to the notice of the Government of Bengal, and strenuous measures are sure to be taken to put a stop to these robberies. I am of opinion too that the gradual establishment of large "feeder" magazines in the mining districts, which I advocated when I was Chief Inspector of Explosives, Bengal, combined with certain alterations in the present "permit" system, which I hope to be able to introduce, will all tend to render these robberies less probable in the future. The robberies so far have occurred in the smaller magazines, whose owners as a rule are not inclined, for a small stock of explosive, to spend the money to make their magazines very substantial, and to provide them with a strong thick wooden outer door lined on the outside with plate iron, as is done by large firms like Messrs. Gillanders Arbuthnot and Co., Agents for Messrs. Nobel and Co., who have already built first class "feeder" magazines at Barakar and Giridhi, and are constructing others at Durgapur near Raniganj. I believe also that this firm is thinking of establishing one at Hazaribagh. Owing to the presence of these large magazines, it should only be necessary therefore for mine owners in the surrounding districts to keep such a small amount of stock in their magazines as hardly to make it worth the while of any one to break into the magazines. Unfortunately the present permit system somewhat militates against this desirable state of affairs. Before explosives can be delivered from a large "feeder" magazine to any of these other magazines, by the Rules under the Indian Arms Act it is necessary for the supplier of the explosive to obtain a transport license from the Magistrate of his District, and also a permit from the Magistrate of the district into which the explosive is to be transported. The mercantile community complain that under this system they are constantly subjected to very considerable delay and consequent inconvenience owing possibly to the absence of District Officers on tour or other causes. This delay means that small magazine owners have to keep a larger stock of explosive in their magazines than they would otherwise have to, as they are afraid of their supply running short before it can be renewed. I am therefore asking the opinions of Local Governments as to whether there would be any objection to some sort of general license or permit being granted to accredited firms allowing them to deliver weekly, or monthly, as the case might be, to certain stated firms or persons, an amount of explosive, not exceeding a fixed quantity, which would be less than that allowed under the possession license of such firms or persons, on the condition that immediately on the occasion of each such transaction, information of the amount delivered, is given to the licensing authority and to the District Magistrate of the district into which the explosive is being transported. On receipt of the replies from Local Governments I intend to bring the matter up for the consideration of the Government of India. As long as sufficient and effective provision is made for the public safety, and for preventing explosives getting into wrong hands, there

seems no reason why mercantile activity and enterprise should be in any way impeded.

Imports of explosives.

14. The Director General of Statistics has kindly given me the following statistics regarding the imports of explosives during the year 1899.

	lbs.	Value in Rs.
Ordinary gunpowder	184,490	66,459
Smokeless ,, ...	148,364	172,248
Other explosives	843,920	801,070
TOTAL	1,176,774	1,039,777

I have asked the Director General of Statistics to be so good as to give me separately in future the exact amounts of dynamite, blasting gelatine, and gelignite respectively imported, as I think it is necessary for this Department to have these records.

General Remarks.

15. Some points of interest in connection with the work done by this Department during the year are mentioned below.

(*a*) The work of this Department has increased considerably during the year, as can be judged by the fact that twice as many letters have been issued and received, as compared with the previous year. This increase is likely to continue now that the establishment of an Explosives Department has become generally known. The Department has been frequently consulted by Local Governments, officials, and the mercantile community with regard to explosives, petroleum, inflammable substances and dangerous chemicals, etc.

Increase of work.

(*b*) All licenses for factories and magazines have now to pass through this Department for examination and recommendation before they are granted. There is no doubt that this has effected considerable improvement. Several magazines, which were in existence before the introduction, by the Government of India on the 28th April 1900, of the table of distances to be kept clear round magazines, and which are not entirely able to fulfil the provisions of that table, have been granted continuing licenses on special conditions.

Licenses.

(*c*) A standard plan of magazines, with general explanatory rules for their construction, have now been issued to all Local Governments, and can be obtained by those desiring to build magazines, on application to this office. The plan is attached to this Report in Appendix C.

Standard plan of magazines.

(*d*) A number of important amendments have been made to the Rules for the manufacture, possession, and sale of explosives, bringing them up to date, and effecting several improvements, which have been found to be necessary after the practical experience of two years' inspection work. The rules to regulate the transport and importation of explosives have been revised and have now been circulated to Local Governments for criticism previous to their being brought into force. The Rules for the transport and importation of explosives in the port of Madras have also been revised.

Explosives Rules.

(*e*) The importation into this country of an American explosive called "Rack-a-Rock" has been prohibited, as it had failed to get licensed in England some years ago, being considered too sensitive under certain conditions. In connection with this case an amendment is being made to the Rules for the transport and importation of explosives so as to prevent the importation of any other explosives in like-condition.

Rack-a-Rock.

(*f*) Draft provisional rules were drawn up during the year by Local Governments for the importation, possession, sale and transport of Carbide of Calcium, to which reference was made on page 5 of my First Annual Report. These rules were submitted to this Department for opinion. I considered them too restrictive and stringent, inasmuch as Carbide of Calcium was treated somewhat like dynamite, while no precautions were enforced as regards the generation of acetylene gas, in which operation, I think, accidents are considerably more likely to occur. I consequently drew up model rules, which have been circulated to Local Governments by the Government of India with a view to local rules being drafted on those lines. I hope that these rules will shortly be published, as a great deal of Carbide of Calcium is being imported, and acetylene installations have already been set up in several places.

Rules for Carbide of Calcium.

(*g*) Two notifications regarding acetylene have been issued during the year by the Government of India, and are given in Appendices D and E.

Acetylene.

(*h*) Questions have been asked regarding a substance called "acetyloid," which has lately been imported into this country. Acetyloid can practically be looked upon and treated as Carbide of Calcium, as it is only a special preparation of Carbide of Calcium, which has been subjected to a chemical process to render it less impervious to water.

Acetyloid.

16. In conclusion I would bring to notice that my probationary period of appointment as Chief Inspector of Explosives terminates this year on the 5th September, and hence it will be necessary to take steps shortly to settle the question of my permanency.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS, *Major, R. A.,*

Chief Inspector of Explosives, India.

8080 8

Appendix A.

List of Magazines and Licenses granted under rule 17 for the year 1900.

Province or Presidency.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed license.	New license.	Total.
Assam ...	Cachar	4	...	4	4	...	4
	Lakhimpur	1	...	1	1	...	1
	Sibsagar	1*	...	1	1	...	1
	Total ...	6	...	6	6	...	6
Bengal ...	Burdwan	14	2	16	14	2	16
	Darjeeling	3	...	3	3	...	3
	Gaya	3	...	3	3	...	3
	Hazaribagh	5	2	7	5	2	7
	Hooghly	1	...	1	1	...	1
	Manbhum	10	...	10	10	...	10
	Midnapur	1	...	1	1	...	1
	Singbhum	1	...	1	1	...	1
	Total ...	38	4	42	38	4	42
Bombay ...	Bombay	2	...	2	9	...	9
	Karachi	3	...	3	3	...	3
	Total ...	5	...	5	12	...	12
Burma	Mergui	1	...	1	1	...	1
	Syriam	1	...	1	1	...	1
	Total ...	2	...	2	2	...	2
Central Provinces...	Bilaspur	...	1	1	1	...	1
	Raipur	3	...	3	6	...	6
	Saugor	...	1	1	...	1	1
	Total ...	3	2	5	7	1	8
Madras ...	Anantapur	...	2	2	...	2	2
	Coimbatore	...	1	1	...	1	1
	Conoor	1	...	1	1	...	1
	Godaveri	...	1	1	...	1	1
	Madras	5	...	5	5	...	5
	Nellore	1	1	2	1	1	2
	Ootacamund	2	...	2	2	...	2
	Vizagapatam	2	...	2	2	...	2
	Total ...	11	5	16	11	5	16
North-West Provinces and Oudh.	Cawnpur	1	...	1	1	...	1
	Dehra Dun	1	...	1	1	...	1
	Lucknow	1	...	1	1	...	1
	Meerut	3	...	3	3	...	3
	Naini Tal	1	...	1	1	...	1
	Shahjehanpur	1	...	1	1	...	1
	Total ...	8	...	8	8	...	8
Summary.							
Assam		6	...	6	6	...	6
Bengal		38	4	42	38	4	42
Bombay		5	...	5	12	...	12
Burma		2	...	2	2	...	2
Central Provinces		3	2	5	7	1	8
Madras		11	5	16	11	5	16
North-West Provinces and Oudh		8	...	8	8	...	8
Grand Total ...		73	11	84	84	10	94

Notes.—* This magazine was abandoned during the year.

Besides the two magazines licensed in Bombay, there are 7 firework godowns licensed under Rule 17.

At Karachi there is besides the three magazines licensed a Roburite Factory licensed under Rule 12.

Appendix B.

Accidents by fire or explosion which have been brought to the notice of the Explosive Department from 1st January 1900 to 31st December 1900.

Serial number.	Date of accident.	Nature of explosive or of dangerous or inflammable substance.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
			EXPLOSIVES.			
1	July 1900 ...	Dynamite	Richmond Estate S. E. Wynaad, Madras.	Blasting was being carried out in a tunnel. When the fuzes had been laid, every one was called out, and then one man went in with a candle to light the fuzes. He lit one, but the candle went out before he could light the other. Instead of coming out at once, the man foolishly stayed to light a match. Before he had done so, the first fuze burnt out, and the charge exploded, causing injuries to his right eye and left ankle.	...	1
2	October 1900 ...	Dynamite ...	Sharanur-Cochin Extension, Madras Railway.	A man was drilling a hole in a Railway cutting for blasting purposes, when an explosion occurred, injuring him. It was subsequently found that the man was drilling a hole along side an unexploded charge.	...	1
3	27th October 1900 ...	Dynamite	Sharanur-Cochin Extension, Madras Railway.	By some mistake a missfire was not noticed at the time, and was found by a cooly, who began to dig the tamping out with a steel bar, with the result that the charge exploded causing injuries to himself and another man.	...	2
				TOTAL ...	...	4
4	26th May 1900 ...	Gunpowder	Warora Colliery, Central Provinces.	Blasting powder was being manufactured by a contractor for use in the mines, when an explosion occurred by which 9 persons were killed immediately and 4 more died subsequently of their injuries. The cause of the explosion was believed to be the presence of some foreign substance or grit during the milling or incorporation operation.	13	...
5	27th May 1900 ...	Gunpowder	Hyderabad	Two women were engaged in pounding a mixture of sulphur, saltpetre and charcoal in a wooden mortar with a wooden pestle, when the mixture suddenly ignited and set fire to their clothes, with the result that one woman died and the other was severely burnt. A Magisterial enquiry was held, and the conclusion arrived at was that some grit or other hard substance had found its way into the mortar and so caused its ignition.	1	1
6	21st June 1900 ...	Gunpowder	Tenkasi, Madras ...	An explosion occurred on the premises of a native dealer, licensed under Rule 8 for the manufacture, sale, and possession of gunpowder and fireworks, killing 7 coolies and injuring 2 others who were at the time engaged in the operation of mixing by pounding the mixture in a mortar with pestles. The Magistrate, who investigated the case, attributed the cause of the explosion to the presence of a small stone or grit in the mortar.	7	2
7	8th October 1900 ...	Gunpowder	Madura, Madras ...	Several men were carrying out blasting operations in a well. A stone from one of the blasts killed a woman, who happened to be in a garden close by.	1	...
8	December 1900 ...	Gunpowder	Tingalore, Madras ...	A lad of about 18 years was engaged in incorporating gunpowder in a mortar with a pestle, when an explosion occurred, injuring him and another boy.	...	2
				TOTAL ...	22	5
9	14th April 1900 ...	*Fireworks.*—Called Chandrajota, consisting of powdered saltpetre, gum copal and red sulphide of arsenic.	Palgad, Ratnagiri, Madras	A man with a lighted pastil in his hand was seated near where a seer of this composition was being kept in a house, and a spark fell into the mixture, which immediately took fire and scorched 3 persons, who were near.	...	3

Accidents by fire or explosion which have been brought to the notice of the Explosive Department from 1st January 1900 to 31st December 1900.—contd.

Serial number.	Date of accident.	Nature of explosive or of dangerous or inflammable substance.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons. Killed.	Injured.
			EXPLOSIVES—*contd.*			
10	April 1900 ...	*Fireworks*—Called gola, otherwise a potash cracker composed of realgar (red sulphide of arsenic) and chlorate of potash.	Cawnpore	A man was on his way home in the evening when some unknown evily disposed person struck him on the back with a potash cracker, which exploded and inflicted a deep wound causing the man's death.	1	...
11	24th June 1900 ...	*Fireworks.*—Called peacrackers, which are pellets of a composition consisting of sulphide of arsenic and chlorate of potash.	Kobathur, Madras ...	These crackers are made by pounding each of the 2 substances separately and then very small quantities of each in equal parts are tied together tightly with a small stone in a piece of cotton rag. A man was tying one of these packets when it exploded, killing a child and burning the man.	1	1
12	14th August 1900 ...	*Fireworks.*—Called gola, consisting of saltpetre, sulphur, and coal of Russa wood.	Sitapur	A man was smoking his hukka (hookah) near where a gola was lying. A spark fell on it, causing an explosion, which so injured the man that he died next day.	1	...
13	16th October 1900 ...	*Fireworks.* Consisting of red arsenic (impure sulphide of arsenic) and saltpetre.	Nellore, Madras ...	A man was taking down a tin of this composition, which was hanging from the ceiling of his house, when it accidentally slipped out of his hand and fell down. The mixture exploded causing his death and injuries to his son and mother-in-law.	1	2
14	22nd October 1900...	*Fireworks.*—A composition consisting of chlorate of potash and hudhal, the latter a mixture of a chlorate with a sulphuret.	Salem, Madras ...	A native licensed dealer was selling this mixture on his premises, and another man was filling reed tubes with the mixture, and tying them up with string. One of the tubes exploded, and the explosion communicated itself to the rest of the mixture in the shop, causing a severe explosion, which precipitated the licensed dealer into the street and injured him severely. Another man standing by was also slightly hurt.	...	1
15	23rd October 1900...	*Fire works*—Called Patka consisting of chlorate of potash and momchal (compound of arsenic and sulphur).	Goalpara Lane, Calcutta	Some boys set fire to these fireworks in the street, and they exploded, injuring the nose of a passer by.	...	1
16	4th October 1900 ...	*Fireworks.*—Crackers containing momchal (a compound of arsenic and sulphur) and chlorate of potash and small stones.	12 Tanti Bazar Lane, Calcutta.	A lad of 11 years opened out and dried the contents of some of these crackers, which he had purchased the previous year, and which had become damp. After drying the composition, he rebound it into large balls. He set fire to one of these ball crackers near where his father was seated and it exploded with a loud report, and the pieces of stone, that are placed inside to cause friction between the ingredients so as to ignite them, struck his father in both eyes and injured them.	...	1
				TOTAL ...	4	9
			CHEMICALS.			
17	11th August 1900 ...	Sulphuric acid ...	The Jetties, Calcutta ...	Five coolies were seated near six barrels of sulphuric acid, which had been landed from the S. S. "Clan Urquhart" and placed on one of the Jetties. Suddenly the head of one of the casks was blown off, and the coolies were burnt about their bodies by the acid which was sprinkled about. Several instances of bursts occurred in the same consignment. The barrels or casks were all of iron or steel, and the cause of the explosion was attributed to the acid acting on the iron and thereby generating gas.	...	5
18	16th September 1900	Carbolic acid ...	Munsurpur station, North-Western Railway.	While a cooly was delivering stores from a train at this station, a bottle of carbolic acid, which was in his hand, was broken by its being struck against the door of the truck by a sudden jerk of the train, and the cooly was severely burnt by the acid.	...	1
19	20th October 1900 ...	Phosphorus ...	16 Bhowani Churn Dutt's Lane, Calcutta.	A man was powdering some phosphorus in front of his house for making fireworks when it exploded, causing him injuries, and also to a boy who was sitting near.	...	2

Accidents by fire or explosion which have been brought to the notice of the Explosive Department from 1st January 1900 to 31st December 1900—concld.

Serial number.	Date of accident.	Nature of explosive or of dangerous or inflammable substance.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons. Killed.	Injured.
			CHEMICALS—*contd.*			
20	29th September 1900	Chlorate of potash ...	150, Lower Chitpur Road, Calcutta.	A woman was drying a tin containing chlorate of potash, kept for manufacturing bombs, which had become a little damp, when the chlorate of potash suddenly exploded. Her left hand was blown off and the fingers of her right hand injured. Another woman standing near was also injured by fragments of the tin box on her right arm.	...	2
21	15th October 1900...	Chlorate of potash ...	Jorasanko, Calcutta ...	A native dealer in chlorate of potash crackers kept about 300 to 400 of the crackers in a paper box hung up on the wall and above them, in an open copper utensil suspended on the wall, he also kept a quantity of powdered chlorate of potash. At night a tin kerosine oil lamp was lighted in their vicinity. The man's wife slept on a bed close to the wall. On the night of the accident, the man was aroused by a loud report and found the room in darkness. On getting a light, he found his wife dead with her skull smashed, and the copper utensil blown to pieces.	1	...
22	21st October 1900 ...	Chlorate of potash ...	Chick Bazar, Bangalore	A man was making some crackers called "koroos" and was grinding some powder on a stone. He had a bottle of chlorate of potash by his side. He took some out of the bottle, weighed it and mixed it with the powder, but he accidentally dropped the scales and weights on the bottle and there was an explosion, which injured him above the face, arms, and chest.	...	2
				TOTAL ...	1	11
			PETROLEUM.			
23	9th November 1900	Crude earth oil ...	Near the Athegyi Police station, Bassein, Burma.	A Burman boat laden with 7,000 vis of crude earth oil caught fire while lying near the Athegyi bazaar, and was totally destroyed after floating in mid stream for some hours. The fire was supposed to be caused either by a fire from a cheroot or from the burning of some light. No lives were lost.	...	...
24	25th February 1900	Oil fuel	Pegu River, Burma ...	The S. S. *Kokine* belonging to Messrs. Finlay, Fleming & Co., Managing Agents of the Burma Oil Company, caught fire and was totally destroyed without loss of life. A court of enquiry was held which found that oil had got into the bilges either from a leak in the service pipe from the oil fuel tank or that one of the burners was left running or in both ways. When the burner of the port furnace of the starboard boiler was lit, there was an explosion of gas and the gas from the oil in the bilges ignited. When the fire became fierce, the connections with the oil tank melted and that oil fed the fire till it burnt out. Several recommendations were made by the court as to the general arrangements on board oil fuel steamers. The court also found that none of the Engineers were guilty of culpable negligence, but was of opinion that if they had experience of the working of oil fuel, the accident would not have happened. No printed instructions for the guidance of those using liquid fuel were carried on board the vessel.	...	...
25	21st December 1899	Oil fuel	Myinmu, Burma ...	A serious explosion took place on the Irrawaddy Flotilla Company's Steamer *Pekin*, whereby fourteen persons were killed, including the third Engineer and the Clerk of the ship, who were Eurasians. A court of enquiry was held and the cause of the explosion was considered to be due to the fact that the hatches of the oil tank were opened and an ordinary lamp was brought near for inspection purposes, which ignited the vapour or gas from the oil tank and there was an explosion. A quantity of straw in the neighbourhood also caught fire and added to the disaster. The main responsibility for the accident was considered to rest with the 3rd Engineer. The Irrawaddy Company, however, had no copy of their rules hung up on the ship, and had not supplied any safety lamps. Total ...	14	...
					14	...

Summary of accidents during the year 1900.

Kind of explosive or dangerous and Inflammable substance.	Accidents causing loss of life and bodily injury.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons.			
		Killed.	Injured.		
Explosives.					
Dynamite	3	...	4	.....	3
Gunpowder	5	22	5	.....	5
Fireworks	8	4	9	.....	8
Totals ...	16	26	18	.....	16
Chemicals.					
Sulphuric Acid	1	...	5	.....	1
Carbolic Acid	1	...	1	.....	1
Phosphorus	1	...	2	.....	1
Chlorate of Potash	3	1	3	.....	3
Totals ...	6	1	11	.....	6
Petroleum.					
Crude earth oil	...	...	...	1	1
Oil Fuel	...	...	...	1	1
Do.	1	14	...	.....	1
Totals ...	1	14	...	2	3
Grand Total ...	23	41	29	2	25

Appendix C.

STANDARD PLAN

OF AN

EXPLOSIVES MAGAZINE

FOR

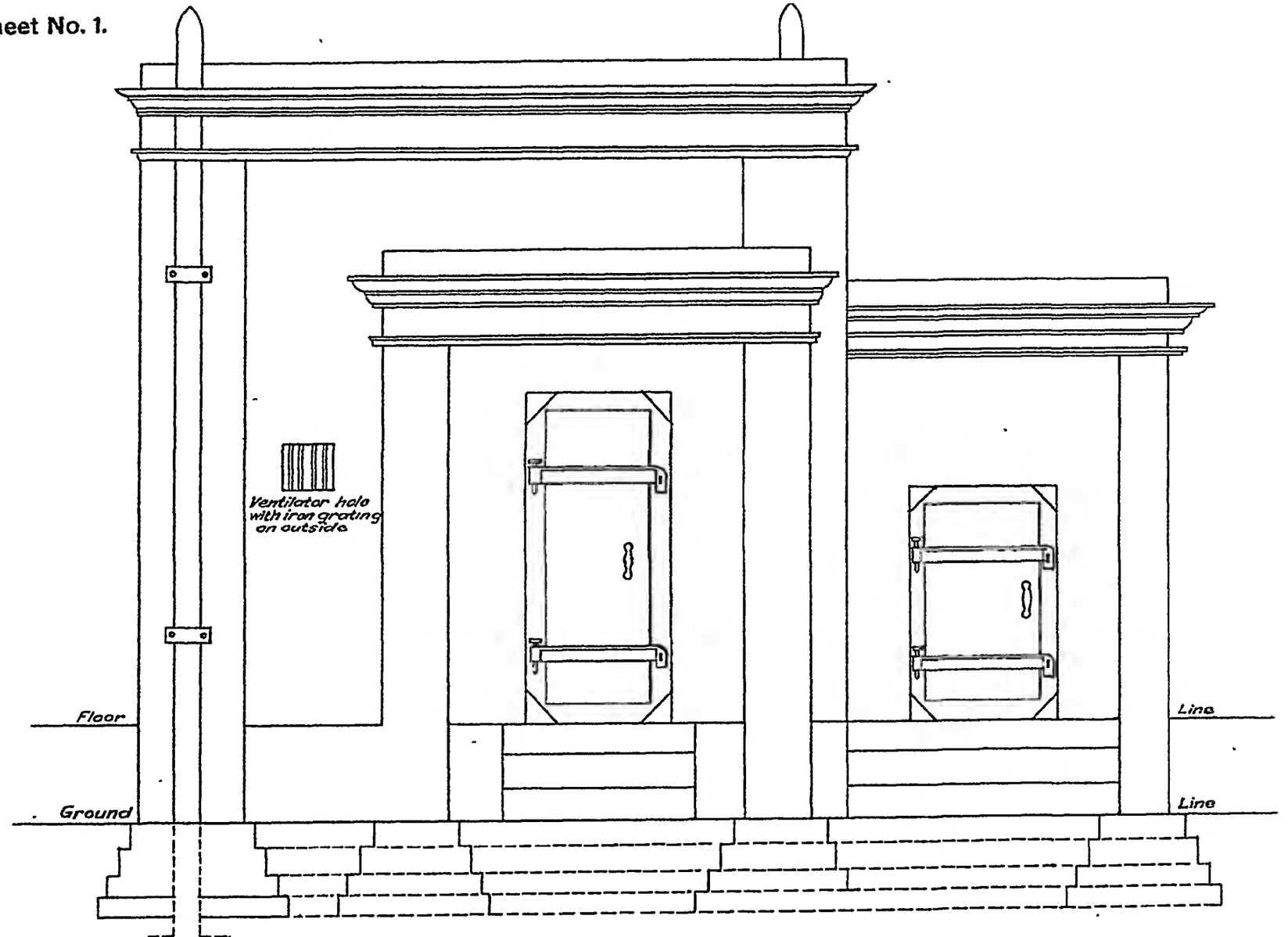
INDIA

PREPARED BY

THE

CHIEF INSPECTOR OF EXPLOSIVES, INDIA.

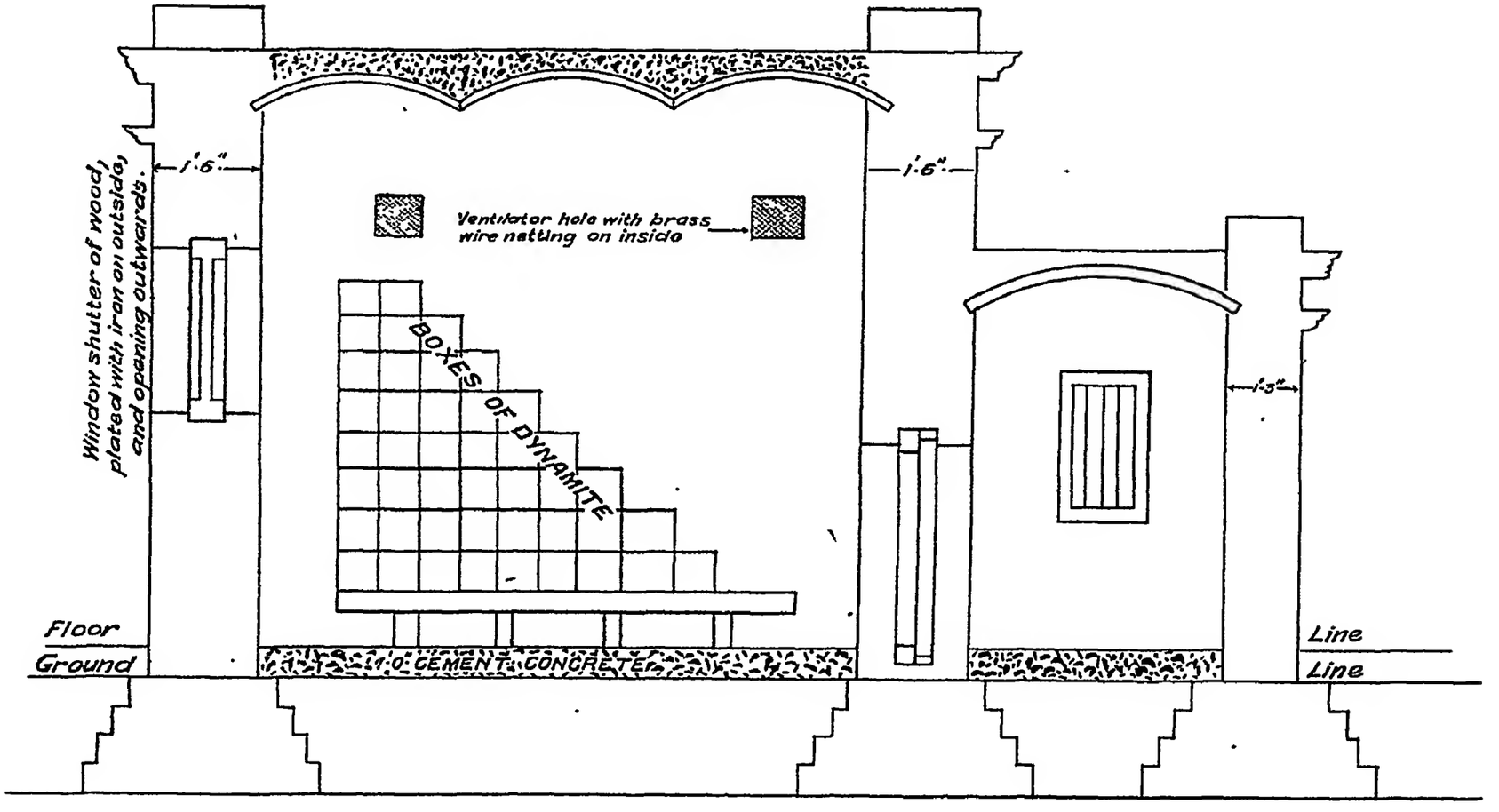
Sheet No. 1.



FRONT ELEVATION.

I B., Topo Dy. No 1.021
Exd. C J. A. April 1901

Sheet No. 3.



SIDE ELEVATION.

I. B., Topo. Dy. No. 4.023.
Exd. C. J. A., April 1901.

Notes to be observed on the construction of an Explosives Magazine built as per Standard Plan attached.

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1. The Detonator annexe is only permissible, if the number of Detonators licensed to be stored does not exceed 25,000; for quantities exceeding this amount, a separate building must be constructed at some distance from the Magazine.

2. Dynamite, Blasting Gelatine, Gunpowder and Safety Fuze can be stored in the same cell. If in addition Safety Cartridges, Railway Fog Signals and Percussion Caps are licensed to be stored, a separate cell must be built on the opposite side of the Magazine to that of the Detonator store for the Safety Cartridges, Railway Fog Signals and Percussion Caps.

3. In the storage of Dynamite and explosives of a like nature, the main object aimed at is to keep them well ventilated, dry and cool.

4. The size of the Magazine depends entirely on the quantity of explosives to be stored and can be built to suit requirements, and consequently general dimensions are not given. The thickness of the walls, as given in the plan, must, however, be observed.

5. The outer doors and windows of the Magazine should be of at least $\frac{1}{4}$ inch wrought iron plate, faced on the inside with wood.

6. All doors and windows must open outwards.

7. The floor of the Magazine must be not less than one foot above the ground.

8. The interior of the Magazine, that is, the floor, walls and roof, must be plastered smooth with best Portland cement.

9. The receptacle with water, placed in the lobby of the Magazine for natives to put their feet into, should be either a tub of wood or made of cement about one foot high and eighteen inches in diameter.

10. There must be no uncovered iron or steel in the interior of the Magazine. The locks, keys, bolts, hinges and other internal fittings must be of brass or gun-metal.

C. A. MUSPRATT-WILLIAMS, *Major, R. A.,*
Chief Inspector of Explosives, India.

Appendix D.

No. 2289.

GOVERNMENT OF INDIA.

HOME DEPARTMENT.

PUBLIC.

Simla, the 31st August 1900.

NOTIFICATION.

In exercise of the powers conferred upon him by section 6 of the Indian Explosives Act, 1884 (IV of 1884), the Governor General in Council is pleased to prohibit absolutely the manufacture, possession and importation of such acetylene as is declared to be an explosive by Notification of the Government of India in the Home Department, Public, No. 1747, dated the 11th August 1899.

J. P. HEWETT,

Secretary to the Government of India.

Appendix E.

No. 3291.

GOVERNMENT OF INDIA.

HOME DEPARTMENT.

PUBLIC.

Calcutta, the 7th December 1900.

NOTIFICATION.

I.—IN exercise of the power conferred by section 17 of the Indian Explosives Act, 1884 (IV of 1884), the Governor General in Council is pleased hereby to declare that acetylene, when in admixture with atmospheric air or with oxygen gas in whatever proportion and at whatever pressure and whether or not in admixture with other substances, shall be deemed to be an explosive within the meaning of the said Act.

II.—In exercise of the powers conferred by section 6 of the said Act, the Governor General in Council is pleased to prohibit the manufacture, possession or importation of such acetylene as is declared by paragraph I of this Notification to be an explosive:

Provided that nothing in this Notification shall apply to acetylene in admixture with air when such admixture takes place only in a burner or contrivance in which the mixture is intended to be burnt:

Provided, also, that nothing in this Notification shall be held to apply to an admixture of acetylene and air which may unavoidably occur in the first use or re-charging of an apparatus properly designed and constructed with a view to the production of pure acetylene.

J. P. HEWETT,

Secretary to the Government of India.